10/23/17

"The will to succeed is important, but what's more important is the will to prepare."-Bobby Knight

HW: "2017 A2 CC L20 Simplifying Rational Expressions" #8-12, 16
Test 3 on Monday 10/30

AIM: How do we Simplify Rational Expressions?

Warm Up:

1) What does "Undefined" mean?

The denominator is zero (Except $\frac{0}{0}$ which is indeterminant)

2) What does it mean to "simplify"?

Perform all possible operations

* Reduce all fractions

When we see rational expressions we should immediately factor what we can!
(fractions)

Once the denominator is factored we can identify any restrictions. We write the restrictions to avoid undefined fractions.

When everything is factored we can "cancel" any common factors of the numerator and the denominator.

connected by multiplication

***You can only cancel factors, not terms!***

$$\frac{\cancel{x}+3}{\cancel{x}}$$

No!

2. Find the value(s) of the variable for which each rational expression is not defined.

undefined

(a) $\dfrac{x^2-49}{2x^2-3x}$

$2x^2-3x=0$

$x(2x-3)=0$

$x=0$ | $2x-3=0$, $x=\frac{3}{2}$

(b) $\dfrac{4}{c^2-16}=0$

$(c+4)(c-4)=0$

$c=-4$ | $c=4$

(c) $\dfrac{x-2}{x^2+4}=0$

$x^2+4=0$

$-4\quad -4$

$\pm\sqrt{x^2}=\pm\sqrt{-4}$

$x=\pm 2i$

Not real!

Therefore no real values make it undefined

(d) $\dfrac{6}{3x^3-8x^2+4x}=0$

$x(3x^2-8x+4)=0$

$3x^2-6x-2x+4$

$3x(x-2)-2(x-2)$

$x(x-2)(3x-2)=0$

$x=0$ | $x=2$ | $3x-2=0$, $x=\frac{2}{3}$

3. $\frac{15x^2}{35x^4} = \frac{3\cdot\cancel{5}\cancel{x}\cancel{x}}{7\cdot\cancel{5}\cancel{x}\cancel{x}xx} = \boxed{\frac{3}{7x^2}}$ simplified

$\frac{35x^4}{35} \neq \frac{0}{35}$

$x^4 \neq 0$

$x \neq 0$ restriction

4. $\frac{x^2+2x}{x} = \frac{\cancel{x}(x+2)}{\cancel{x}} = \boxed{x+2}$

$x \neq 0$

restriction

Factor First !!!

look for restrictions BEFORE we start cancelling

5. $\frac{2x^2-8}{(2x-1)(x-2)} = \frac{2(x^2-4)}{(2x-1)(x-2)} = \frac{2(x+2)\cancel{(x-2)}}{(2x-1)\cancel{(x-2)}}$

$= \boxed{\frac{2(x+2)}{2x-1} = \frac{2x+4}{2x-1}}$

$(2x-1)(x-2)=0$

$2x-1=0$ | $x=2$

$+1 \quad +1$

$\frac{2x}{2}=\frac{1}{2}$

$x=\frac{1}{2}$

rest.
$x \neq 2$
$x \neq \frac{1}{2}$

6. $\frac{4b^2-4ab}{3a^2-3ab} = \frac{4b\cancel{(b-a)}^{-1}}{3a\cancel{(a-b)}} = \boxed{\frac{-4b}{3a}}$

$\frac{5-2}{2-5} = \frac{3}{-3} = -1$

$\frac{23-6}{6-23} = \frac{17}{-17} = -1$

rest.

$3a(a-b)=0$

$3a=0$ | $a-b=0$

$a=0$ | $+b \ +b$

$a=b$

$a \neq 0$

$a \neq b$

A M

7. $\frac{x^2+6x+5}{x^2-x-2} = \frac{(x+5)\cancel{(x+1)}}{(x-2)\cancel{(x+1)}} = \boxed{\frac{x+5}{x-2}}$

rest: $x \neq -1, 2$

$(x-2)(x+1)=0$

$x=2$ | $x=-1$

13. $\dfrac{x^2-4}{x^4-16}$

17. $\dfrac{a^2-b^2}{a^2-6b-ab+6a}$